path is not cut off by a steep mountain side; the ascent, at any rate the nearest visible part of it, presents a moderate incline only, and among the rocks there are narrow paths which lead on high; there are many zealous and skilled investigators; how can we but look hopefully ahead to the successes of future efforts?"

M. I. Pupin.

Columbia College, New York.

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*THE BERNE PHYSIOLOGICAL CONGRESS (II.).**

Thursday, September 12. Morning demomonstrations and papers (Chairmen, Profs. Dastre and Einthoven).

Prof. S. Arloing (Lyons) described experiments showing that the persistence of electric excitability of the peripheral ends of divided nerves was of long duration, although varying with the animal and nerve experimented on. The excitability of the spinal accessory and facial nerves lasted in dogs four to five days, in asses eight to ten days. In one case the peripheral end of a cat's sciatic was excitable after thirty-one days. The different kinds of nerve fibres in one nerve trunk have different rates of degeneration and their existence can be thus demonstrated; for instance, the vagus of some animals seven or eight days after section has lost its inhibitory action on the heart, and now produces acceleration on stimulation. In the case of an ass, stimulation of the peripheral end of the vagus produced standstill of the heart accompanied by a rise in blood pressure, which Prof. Arloing considered to be due to tetanus of the cardiac muscle. The graphic record of this experiment was shown.

Discussion by Prof. Schiff.

Dr. M. Arthus (Paris) discussed the action of lime salts in promoting the coagulation of the blood. He did not agree with the late Prof. Al. Schmidt that the action of the oxalates in preventing clotting was a specific one, independent of the precipitation of lime salts, as the same action was possessed by citrates and fluorides.

Discussion by Prof Kühne.

Prof. J. v. Kries (Freiburg) discussed the color-blindness, except for red, of eyes which have been long unexposed to light. He did not agree with Hering that this was due to the activity of the white-black substance alone, for he found the periphery of the retina one to two hundred times superior to the center, and held that the retinal rods by virtue of their visual purple possess the power of adaptation to darkness, while the cones distinguish colors.

Discussions by Profs. Grützner, Hensen, Pflüger (Berne) and Kühne.

Prof. A. Gamgee (Lausanne) described his investigation of the absorption bands in the outer violet and ultra-violet produced by haemoglobin and its derivatives, photographs of which were shown. The absorption bands of Turacin, the pigment containing copper obtained from the feathers of certain birds, were also described. Its ultra-violet absorption band is identical with that of reduced haemoglobin.

Discussion by Prof. Tschirch.

Prof. S. Epstein (Berne) gave an experimental demonstration of the increase in visual acuity caused by auditory impressions. He did not agree with the localization of the nervous process in the cerebral cortex, but held it to take place in the corpora quadrigemina, in which the auditory stimuli are reflected on to the optic nerves, these functioning as efferent as well as afferent nerves. In favor of this view he described an experiment in which faradisation of the cochlear nerve produced movements of the eyes and increased sensibility of the conjunctiva. Prof. Epstein also showed an improved perimeter to be used

*Continued from Vol. II., No. 50, p. 781. (December 13, 1895.)

in the dark, which rendered simulation extremely difficult.

Prof. Burdon Sanderson (Oxford) showed projections of photographic records of the movements of the capillary electrometer caused by muscle currents. These justified the proposition that there are two kinds of electrical response of a muscle to indirect stimulation, that accompanying the wave of excitation and in addition to this a diminution of the E. M. F. of the previously existing muscle current. This latter is evoked by the constant current, by stimuli of great frequency, by chemical stimulation, and in the strychnine spasm.

Dr. .A Waller (London) projected photographs of the excursions of a Thomson's galvanometer produced by the action current of nerve stimulated for one eighth of a minute every minute and subjected to the action of equimolecular solutions of Na Cl, Na Br, and Na I, of ether and chloroform, and of various alkaloids.

Discussion by Dr. Boruttau and Prof. Fano.

Dr. P. DuBois (Berne) showed an electrodynamometer for physiological and therapeutical purposes.

Dr. A. Beck (Lemberg) and Prof. Cybulski (Cracow) demonstrated the electrical effects accompanying cerebral activity in the monkey.

Prof. N. Wedensky (StPetersburg) demonstrated the effects of simultaneous stimulation in different rhythms of two points of a nerve, the action currents of which were led through a telephone. Variations of the tone heard were produced by interference between the two stimulations.

Afternoon demonstrations and papers (Chairmen, Profs. Vitzou and Fredericq).

Dr. F. Laulanié (Toulouse) described his respiration experiments in a closed chamber, and discussed the results obtained.

Discussions by Prof. Zuntz.

Prof. W. Rutherford (Edinburgh) projected micro-photographs of preparations of crayfish muscle, the structure of which he has investigated in the contracted and in the relaxed condition. He believes in the fibrillary structure of muscle. Three stages of the process of contraction can be made out, the first two of which are due to the absorption of water by Bowman's elements, which in the third stage actually shorten.

Prof. de Burgh Birch (Leeds) described with the aid of lantern projections the graphic methods used in his laboratory by students, which combine convenience with economy.

Prof. I. Rosenthal (Erlangen) showed his method for the estimation of carbonic acid in air for hygienic purposes. The final titration is done with the aid of phenolpthalein.

Discussion by Profs. Zuntz and Grützner.

Dr. M. Cremer (Munich) described his experiments on the formation of starch in potato sprouts from various sugars. Experiments made hitherto have shown a parallelism between the fermentibility and power to form glycogen of the simple sugars. Dr. Cremer found that the fermentible sugars, Dextrose, Lævulose and *d*. Lactose form starch in potato sprouts kept in the dark and free from or with but little starch. A positive result was also obtained once with *d*. Mannose. On the other hand, the unfermentible sugars, Rhamnose, Arabinose, Sorbose and Glucoheptose, gave negative results, but Xylose a positive one. Microscopical preparations were shown.

Dr. E. Gley (Paris) demonstrated experimentally that the intravenous injection of 'peptone' into a dog, the great lymphatic vessels of the liver of which had been tied, does not hinder the coagulation of the blood as usual. He concluded that under the influence of peptone the liver gives rise to some substance preventing coagulation.

Discussion by Dr. Arthus and Profs. Fano and Kühne.

Dr. A. Jaquet (Basle) discussed the influence of tepid baths on nutrition. In fever the number of red corpuscles in the blood is often considerably diminished. After a bath of about the temperature 22° R, the red corpuscles usually increase in number to the extent of from 100 up to 900,000 per cubic millimeter. A similar but slighter effect is seen in individuals not suffering from fever. Antipyrin does not act upon the blood. The artificial heating of a rabbit to 40° and above decreases the number of red corpuscles in the veins of the ears, but increases their number in the liver. Cooling baths would appear, therefore, to improve the tone of the circulation, and thereby better nutrition. The antipyretic action of baths is of secondary importance.

Discussion by Prof. Richet.

Dr. De Rey-Pailhade (Toulouse) demonstrated the formation of sulphuretted hydrogen in liquids containing sulphur by a yeast infusion. He considers a substance to be present in the latter, which he calls 'Philothion,' and which can produce oxidations and syntheses by the formation and interaction of nascent hydrogen and oxygen.

Dr. J. V. Uexküll (Heidelberg) showed a small apparatus for the mechanical stimulation of nerve.

Dr. L. Asher (Berne) showed a rat holder, and myographic records taken with its help.

Dr. F. Schenck (Wurzburg) discussed the interpretation of the observation of Dogiel with the dog, rabbit and cat that stimulation of the cervical sympathetic causes, in addition to dilation of the pupil in the same side as the stimulated nerve, contraction of the pupil of the opposite side. Dr. Schenck's experiments with the dog had shown that, if light was prevented from entering the eye of the stimulated side, the contraction of the pupil of the other eye did not occur, and must have been, therefore, in Dogiel's experiments a consensual reflex, due to the increased amount of the light admitted by the dilated pupil. This explanation could not apply to the rabbit, as in this animal the consensual pupillar reflex does not occur, but, correspondingly, Dr. Schenck could not here confirm Dogiel's original observation. He explained Dogiel's result that stimulation of the central end of one vagus produced contraction of the pupil of the same side and dilation of the pupil of the opposite side, by a previous section performed for other purposes of the cervical sympathetic of the side stimulated.

Friday, September 13. Morning demonstrations and papers (Chairmen Prof. Rosenthal and Mr. Langley).

Dr. J. B. Leathes (London) discussed the osmotic changes between the blood and tissues. He described the effects of strong solutions of cane sugar and dextrose and of hypo-, iso-, and hypertonic solutions of Na Cl on the passage of fluid through the walls of the blood vessels. Dr. Leathes had found the osmotic pressure of the lymph in the thoracic duct to be 1–2 % higher than that of the blood.

Prof. N. Wedensky (St. Petersburg) showed the following experiments: Stimulation of the frog's sciatic nerve with very strong and rapidly repeated shocks soon produced relaxation of its muscle, which, however, became again tetanically contracted when the strength of stimulation was reduced. Reduction of the frequency produced the same result. There is, accordingly, for every strength of stimulation an optimum frequency, and *vice versa*. When the muscle during strong stimulation of its nerve has become relaxed, direct stimulation of it with moderately strong shocks produces contraction only when the stimulation of the nerve is interrupted.

This is to be interpreted as due to the motor nerve endings under pessimum stimulation acting inhibitorily on the muscle, fatigue being excluded.

Dr. F. Lüscher (Berne) described his experiments on the laryngeal nerves in connection with movements of the œsophagus. Stimulation of the recurrent laryngeal was first found to cause a complete act of swallowing. Three fine branches it gives off to the œsophagus were found by localized stimulation to innervate three overlapping segments of it, local contractions of these being produced. Stimulation of the central end of the divided recurrent, its fellow of the opposite side being intact, gives rise to a feeble act of swallowing.

Prof. H. P. Bowditch (Boston) demonstrated a simple model illustrating the mechanism of the ankle joint, Weber's doctrine regarding which was erroneous. The relations between the power and the weight, both when the former (represented by a spring balance) acts from a fixed point external to the system to be moved, and when (as is the case actually in the body) it acts from a point forming part of that system, can be readily shown.

Discussion by Prof Grützner.

Prof. Hensen (Kiel) demonstrated that a stream of air set in vibration by passing a reed cannot sound an organ pipe or resonator like a steady stream. If the stream is strong the resonator or organ pipe alone sounds; if it be weak the reed alone.

Discussion by Prof. Grützner.

Dr. A. White (London) demonstrated his method for artificial circulation through the frog's heart.

Afternoon demonstrations and papers (Chairmen, Profs. Fredericq and Herzen).

Dr. O. Lanz (Berne) showed various animals, some of which had had their thyroid glands removed ('athyreotic'), while the others were having thyroid glands administered to them ('hyperthyreotic'). Thyroidectomy diminished the egg-laying power of hens, while thyroid feeding increased it. If rodents (which have hitherto been held to be immune to the effects of thyroidectomy) are operated on when young, cachexia sets in. Hyperthyreotic animals bear apparently normal young, but these soon show disturbances of growth and function; a kitten taken from its mother and fed on cow's milk, however, henceforward developed normally. A thyroidectomised dog had been kept alive six months by feeding with glands and injections of their extract, cessation of which brought on the characteristic cachexial symptoms. Tolerance of the loss of the gland is not established.

Discussion by Dr. Hanau, Profs. Grützner and Herzen.

Prof. E. Drechsel (Berne) gave an account of his investigations into the chemistry of the hornlike skeletal substance of Gorgonia Cavolinii, a soft coral. This is insoluble in ordinary solvents, but soluble in strong hydrochloric acid. The dried material contains nearly 8% of iodine, and about 2% chlorine, while the whole ash is only about 7%, the iodine being therefore at any rate partly in combination with an organic substance. From the solution of the skeletal substance in baryta water, an organic iodine compound was isolated, provisionally called iodogorgonic acid, which is probably moniodoamidobutyric acid. This is the first organic iodine compound which has been obtained from an animal. It is derived in all probability from the destruction of a proteid substance containing iodine.

Prof. C. S. Sherrington (Liverpool) demonstrated an experiment previously described by him. After division of the 3d and 4th cranial nerves of a monkey the eye is deviated outwards by the uncompensated action of the rectus externus. Stimulation of the cerebral cortex at a point above the 4th frontal convolution

now produces a rotation of the eye inwards due, according to Prof. Sherrington, to an inhibition of the activity of the nucleus of the 6th nerve. Stimulation of the occipital lobe was without effect.

Dr. A. Waller (London) showed photographic records of the retinal currents produced by stimulations by light.

Discussion by Prof. Kühne.

Dr. Axenfeld (Perugia) showed an experiment on binocular color contrast. If, by means of a colored glass before one eye, one of the two crossed transparent double images of an opaque object is made to appear colored, the other image appears of the complementary color.

Dr. C. Phisalix (Paris) had found that the blood of the Salamander not only has the power to give immunity against the poison of this animal, but renders frogs and guinea pigs, into which it is injected, able, to withstand much larger doses of curare than they otherwise can.

Dr. Z. Treves (Turin) communicated experiments, the graphic records of which he showed, demonstrating that different impulses inhibitory of inspiration as well as expiration, pass along the vagi nerves. Their division, after the prevention of all active expiration by section of the cord, can produce more or less marked inspiratory tetanus, which is cut short by weak faradisation of the central ends.

Discussion by Dr. Boruttau and Prof. Herzen.

Prof. A. Mosso (Turin) gave the results of his experiments on the influence of rarefied air on man made on the summit of Monte Rosa (4,600 meters above sea-level). In absolute rest and especially during sleep the respiratory gaseous interchange is lessened, and even standstill of respiration may occur. This must be due to the lessening of the amount of carbonic acid in the blood, as must also be the accompanying quickening of rate of heartbeat. To this condition of lessened carbonic acid in the blood Prof. Mosso gave the name of Akapnia. He described also experiments made on apes in rarefied oxygen, the pressure of which was, however, greater than the partial pressure of oxygen in air. In spite of this the apes showed symptoms analogous to those of mountain sickness. These are supposed to be due both to Akapnia and the direct influence of lessened atmospheric pressure on the nervous system.

Discussion by Prof. Zuntz.

Prof. N. Zuntz (Berlin) gave the results of experiments made by Dr. Schumburg and himself, as well as those made by Dr. Loewy on the functions of respiration and circulation in rarefied air. He laid stress on individual differences of effects observed, and pointed out that moderate regular movement may put an end to dangerous symptoms, while, as is well known, great muscular exertion favors the onset of mountain sickness.

At a business meeting on the morning of September 13 it was decided to hold the next meeting of the Congress at Cambridge, in the first week of September, 1898, with Prof. Michael Foster as President. Profs. Sherrington (Liverpool), E. Fredericq (Liège) and Grützner (Tübingen) were elected General Secretaries.

The admission of members to future congresses, the bibliography of physiological literature, the universal use of the metric system by physiologists were discussed, and other questions were relegated to a committee.

During the Congress week there was an interesting exhibition of physiological apparatus and preparations by Profs. Einthoven, Kahlbaum, Kronecker, Mosso, Tschirch and Dr. Cowl; and by the following mechanicians: Albrecht (Tübingen); Castagna (Vienna); Diederichs (Göttingen); Geissler (Bonn); Hennig (Erlangen); Petzold (Leipzig); Pfister (Berne); Runne

(Heidelberg); Schenk (Berne); Siedentopf (Wurzburg); Streit (Berne); Westien (Rostock); Zimmerman (Leipzig).

CURRENT NOTES ON PHYSIOGRAPHY (XXI).

THE MOORS OF NORTHWEST GERMANY.

AT the eleventh session of the German Geographical Congress, held at Bremen in Easter week, last spring, Dr. Tacke gave an account of the moors of northwest Germany, their utilization and their economic importance. He described two classes: the low marshy moors, of grassy growth, and the upland moors, of peaty and heathery growth; the first rich and the second poor in calcareous and nitrogenous matter. When sufficiently drained, spread over with sand, and enriched with artificial potash- and phosphate-bearing fertilizers, the low-lying marshy moors well repay cultivation. In the last thirty years extensive areas of waste land have thus been brought into productiveness. The more extensive upland moors are less easily redeemed. An old but ill-advised method consists in burning off the peaty surface at the end of a dry season, producing wide-spread smoky skies. An improved method, introduced from Holland, requires the stripping of the peat, which may be sold for fuel, and the mixture of the bottom soil with the underlying sand. Then after sufficient fertilizing, the surface becomes fruitful. Extensive undertakings for colonizing the moors have been successfully carried out in recent years. (Geogr Blätter, Bremen, xviii, 1895, 198–202.)

THE ISLANDS OF EAST FRIESLAND.

THE islands of East Friesland, lying along the low German coast between the estuaries of the Ems and the Weser, are described by Buchenau (Geogr. Blätter, Bremen, xviii, 1895, 202–204) as the last fragments of a formerly continuous coastal margin, built of sand drifted by waves and winds. Dunes cover much of the surface. Behind the coastal barrier, at first grassy moors, then fresh-water reed-marshes and finally salt-water fens were formed on the slowly sinking mainland, the rate of depression being estimated as certainly less than the figure usually quoted, or three-fourths of a foot per hundred years; but in the eleventh century a more rapid sinking probably took place, as great losses of land followed that date. When first formed, the fens behind the sandy coastal barrier must have had but a small run of tide; it is presumed that the English Channel had not then been worn through, and that, the tides entered the North Sea only around Scotland. After the southern Channel was at last opened—about 1000 B. C., as estimated by some geologists—the tides gained greatly in strength; the coastal barrier was overflowed and repeatedly broken through; the fenland, flooded at high tide, bare at low, was gradually washed away. From the time when the Channel was opened, the people waged an unceasing battle with the sea, and as continually suffered defeat; until at last, driven by necessity, they planned a systematic defense against storm and wave, thus rescuing about half of what had before been lost. The vegetation of the islands is well adjusted to its exposed situation. The grass on the open meadows is kept very short by the action of the winds. Bushes are found only in the valleys between the dunes. There are no trees, except when planted near sheltering houses or dunes; any branch which rises above its shelter is soon killed by the storm winds.

PHYSIOGRAPHIC NOTES FROM ICELAND.

JOHNSTON LAVIS, well known from his studies on Vesuvius, went to Iceland in 1890, and contributes an entertaining account of his expedition to the Scottish Geographical Journal for September of this year. Interesting topographic features are